

Appl. No. 10/645,681
Examiner: NHU, DAVID, Art Unit 2818
In response to the Office Action dated April 29, 2004

Date: July 2, 2004
Attorney Docket No. 10112791

REMARKS

Applicant thanks the Examiner for acknowledging Applicant's claim to foreign priority and receipt of the certified copy of the priority document. Responsive to the Office Action mailed on April 29, 2004 in the above-referenced application, Applicant respectfully requests amendment of the above-identified application in the manner identified above and that the patent be granted in view of the arguments presented. No new matter has been added by this amendment.

Present Status of Application

Claims 1-26 are pending in the present application. An informality in the specification is noted. Claims 1 and 14 are objected to because of informalities. Claims 1-26 stand rejected under 35 U.S.C. 102(b) as being anticipated by Mei (U.S. 6,232,171).

In this paper, the specification is amended to add a reference to Figure 1. The informalities in claims 1 and 14 are corrected according to the suggestion of the Examiner. New claim 27 is added. Support for new claim 27 can be found in Fig. 4 of the application.

Reconsideration of this application as amended is respectfully requested in light of the amendments and the remarks contained below.

Rejections Under 102(b)

Claims 1-26 stand rejected under 35 U.S.C. 102(b) as being anticipated by Mei. Applicant respectfully traverses the rejections for the reasons described below.

The rejections of claims 1-26 are insufficient, insofar as they do not comply with the requirements of MPEP 707.07 et seq., which requires that all rejections be stated with completeness and clarity.

MPEP 707.07(d) requires that the grounds of a rejection be "fully and clearly stated." The office action fails to meet this requirement in the present application in connection with claims 1-26.

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The office action refers to "figures 1-10, and the related text on col. 1-10" of Mei to disclose a method for forming bottle-shaped trenches. It is noted that figures 1-10 and columns 1-10 comprise the entire disclosure of Mei. While claims 1 and 14 are addressed with citation to specific reference numbers in the figures, there is no attempt to identify what particular figure or portion of the disclosure is referred to in connection with claims 2-13 and 15-26.

Furthermore, the office action does not specifically address claims 2-9, 11-13, 15-22, and 24-26. While the statements on page 3, lines 5-10 appear to be directed to 3-8, 16-21, and 23, there is no clear indication that this is the case, nor is there any clear statement as to where in the disclosure of Mei these teachings can be found.

In addition, the office action does not clearly state any teaching whatsoever of the limitations recited in claims 2, 9, 11-13, 22, or 24-26. For example, there is no statement as to where in Mei it is taught that the shield layer comprises polysilicon as recited in claims 9 and 22.

Similarly, with respect to claims 1 and 14, the office actions states that Mei teaches "conformally forming an **isolated layer 160** in the trenches and on the hard mask; forming a **shield layer 160** in the lower portions of the trench." [Emphasis added.] There is no explanation as to how the two steps of 1) forming the isolated layer in the trenches and on the hard mask and 2) forming the shield layer in the lower portions of the trench can be anticipated the single step of forming filler oxide layer 160 in Mei.

Finally, claims 8 and 21 recite "wherein after forming the protective layer further comprises driving the dopants into the substrate surrounding the protective layer by thermal treatment." The office action does mention "driving dopants into the substrate by thermal treatment," but this statement is not directed to a specific claim, does not clearly state where the teaching can be found in Mei, and does not include any reference to the timing of the step, i.e., "after the forming of the protective layer".

As the office action fails to state with completeness and clarity the rejections of claims 1-26, Applicant submits that the rejection of claim 1-26 should be withdrawn. Should an ensuing

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office action be mailed which provides new grounds for the rejection of claims 1-26, such an ensuing office action should be made non-final.

Mei does not teach or suggest conformally forming an isolated layer in a trench as recited in claims 1 and 14.

MPEP 2131 prescribes that to anticipate a claim, a reference must teach every element of the claim. In this regard, the Federal Circuit has held:

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

"The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Claims 1 and 14 recite a method for forming bottle-shaped trenches comprising, *inter alia*, "conformally forming an isolated layer in the trenches and on the hard mask." [Emphasis added.]

The office action relies on the formation of filler oxide layer 160 to teach the step of conformally forming an isolated layer in the trenches and on the hard mask. However, as shown in Fig. 2 and described in column 7, lines 31-32, the filler oxide layer is blanketly deposited on the wafer surface to fill the trench. Applicant submits that the step of *conformally* forming an isolated layer in the trenches and on the hard mask as claimed in claims 1 and 14 is distinguishable over the step of *blanketly* depositing a filler oxide layer on the wafer surface to fill the trench as taught in Mei.

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Furthermore, claims 1 and 14 recite "conformally forming an isolated layer in the trenches and on the hard mask; forming a shield layer in the lower portion of the trenches." The office action argues that these steps are anticipated by Mei as follows:

"... conformally forming an **isolated** layer 160 in the trenches and on the hard mask; forming a **shield** layer 160 in the lower portions of the trench."

In claims 1 and 14, two steps are performed, namely conformally forming an isolated layer in the trenches and on the hard mask, and forming a shield layer in the lower portion of the trenches. It is unclear how the single step of forming filler oxide layer 160 as taught by Mei can anticipate these steps. It is further noted that the filler oxide layer 160 fills the trench entirely. It is therefore unclear how the step can be followed by a step of forming a shield layer in the lower portions of the trench. Applicant therefore submits that the steps of conformally forming an isolated layer in the trenches and on the hard mask and forming a shield layer in the lower portion of the trenches as recited in claims 1 and 14 are distinguishable over the step of blanketly depositing a filler oxide layer 160 as taught in Mei.

Additionally, claims 9 and 22 recite that the shield layer is polysilicon. The office action relies on the formation of filler oxide layer 160 to teach the step of forming of the shield layer. Applicant submits that the polysilicon layer recited in claims 9 and 22 is distinguishable over the oxide layer taught in Mei.

For at least these reasons, Applicant submits that Mei does not teach each and every element set forth in claims 1-26, and therefore does not anticipate these claims. In view of these arguments, Applicant respectfully requests that the rejections of claims 1-16 be withdrawn and the application passed to issue.

New Claim 27

New claim 27 recites "conformally forming an isolated layer in the trench and on the hard mask; forming a shield layer in the lower portion of the trench covered with the isolated layer."

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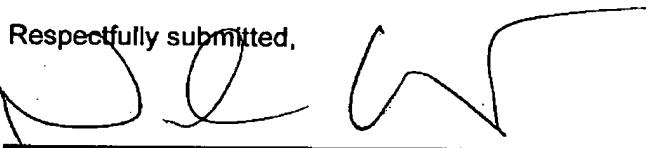
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Applicant submits that Mei teaches neither forming a conformal isolated layer nor forming a shield layer in the trench covered with the isolated layer (see Fig. 3). Instead, Mei teaches forming the oxide filler layer 160 in the trench and then etching back the oxide filler layer 160 to a predetermined depth 160'. For at least these reasons, Applicant submits that claim 27 is allowable over Mei and should be passed to issue.

Conclusion

The Applicant believes that the application is now in condition for allowance and respectfully requests so. The Commissioner is authorized to charge any additional fees which may be required or credit overpayment to Deposit Account No. 502447. In particular, if this response is not timely filed, then the commissioner is authorized to treat this response as including a petition to extend the time period pursuant to 37 C.F.R. § 1.136(a) requesting an extension of time of the number of months necessary to make this response timely filed and the petition fee due in connection therewith may be charged to Deposit Account No. 502447.

Respectfully submitted,



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